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Citation for published version:

Bahriny, F & Bell, S 2020, 'Patterns of urban park use and their relationship to factors of quality: A case study of Tehran, Iran', *Sustainability*, vol. 12, no. 4. <https://doi.org/10.3390/su12041560>

Digital Object Identifier (DOI):

[10.3390/su12041560](https://doi.org/10.3390/su12041560)

Link:

[Link to publication record in Edinburgh Research Explorer](#)

Document Version:

Publisher's PDF, also known as Version of record

Published In:

Sustainability

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Article

Patterns of Urban Park Use and Their Relationship to Factors of Quality: A Case Study of Tehran, Iran

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Received: 2 January 2020; Accepted: 18 February 2020; Published: 19 February 2020



Abstract: Urban parks play an important role in increasing the quality of urban life. Thus, a variety of approaches to planning and decision-making regarding sustainable open spaces and urban parks is needed, especially when models from one location are borrowed to another with a very different culture. In many developing countries cities are expanding without proper planning of public green spaces which places pressure on the quality of life. In common with many Middle Eastern cities, Tehran, the capital of Iran is a large sprawling metropolis which has experienced fast growth since 1970 and with little in the way of comprehensive planning of green spaces as an organised system. To date there has been no comprehensive investigation of urban parks regarding their level of use, range of activities, quality of maintenance, evidence of anti-social activities or the demographic character of their catchment—important information for effective park planning. In this study a representative sample of 16 parks in Tehran was studied using a combination of site assessments and user observations. We found that a combination of factors concerning the quality of the parks such as presence of facilities, existence of water and other special attractions, as well as how well-lit they are, how well maintained and safe they are, has a lot to do with their level of use. Some pleasant parks with good facilities are less well used because of, e.g., evidence of anti-social behaviour, poor maintenance and accessibility. A key aspect we found is the difference between male and female users, with some parks being much less-well-used by women. Much more attention is needed for planning and management of parks in Tehran. The approach applied here has potential to help other cities in similar areas to learn more about their green space systems for planning purposes.

Keywords: park planning; Tehran; site assessment; user observation

1. Introduction

1.1. The Benefits of Urban Parks

It is now well-established that urban parks form important elements within the urban green infrastructure, contributing to quality of life, to promoting the well-being of urban residents as well as providing many social and economic benefits [1–5]. As part of the urban green network they convey important environmental, recreational, aesthetic, economic and psychological advantages [6–8]. They also increasingly playing a role in mental health [9] physical health, health recovery, and stress reduction [10,11]. Urban parks in cities in many developing countries face enormous pressures due to urban sprawl and increasing populations. Better knowledge is needed in order to maximise the benefits.

Urban parks, depending on their location and facilities, provide opportunities for social interaction and physical activity. Many studies have concluded that recreation and leisure activities in urban parks such as walking, running, cycling, and picnicking—in part due to higher standards of living and people wishing for a healthier lifestyle—has increased in recent years [12–14], although lifestyle

diseases from insufficient physical activity continue to increase [15]. One of the motivations for people to use urban parks, especially in dense and crowded cities, is to find a relatively calm and peaceful environment, especially at holiday times and weekends [16,17].

1.2. Negative Effect of Urban Parks (Crime and Safety)

Set against all the positive aspects are a number of negative factors which may be found, depending on the location and context of a particular park. The feeling of safety—or insecurity—plays a significant role in the use of public parks and those with a reputation as dangerous places (perhaps at certain times of the day) can have a negative effect on visitors' perceptions in which perceived risks from crime and the presence of vandalism and anti-social behaviour are seen as a threat affecting use—especially among women [18–20]. Fear of crime has become an important issue in cities in recent years, so there should be a focus of improving personal safety through well-considered planning, design, and management of urban parks and other public open spaces [21]. As Sutton and Farrall [22] showed, gender affects perception of safety and in a review by Hale [23] it was concluded that women report higher fear levels than do men. In Iran, a study in the city of Tabriz concluded that more physically and visually open parks and ones with water feel safer for users of all types. Crime Prevention Through Environmental Design (CPTED) is one approach to deal with issues of insecurity [24]. CPTED sets out principles for all built environments, both indoor and outdoor, aimed at using planning and design to prevent criminals from engaging in anti-social behaviour and for users of a particular environment to feel safe there. Factors to consider include supervision, maintenance, activity and access control in urban parks [25].

1.3. Urban Park Spatial Equity, Accessibility

Since open spaces such as parks have numerous health benefits, improving access to them and their spatial distribution within cities is very important. Since the 1970s it has been noted [26] that spatial equity—the more-or-less equal accessibility to public spaces for all urban residents regardless of socio-economic class, for example—is in many ways more important as a criterion than e.g., spatial quality in ensuring that all people can gain the benefits [27].

Gender inequality is another problem which affects some cultures more than others. In many societies (such as in Iran, the focus of this paper), women's access to public spaces is limited and their feeling of safety is often lower than for men, so access to public amenities, and aspects of their quality of life related to this factor is lower than for men in general and for women in more liberated societies [28].

1.4. Urban Park Planning

It is clear from research that planning and management of public spaces such as parks has an impact on the way that people walk, cycle or undertake other physical and activities. Penalosa and Pearson [29] noted that successful parks are the result of involving people in their improvement, both in planning and in management.

For creating or improving urban parks it is also necessary to know for whom a park is targeted, requiring data about, for example, the age, gender, ethnicity and socio-economic status of users, as well as something of the demand for the various activities programmed there. So, according to Garcia [30], if the above factors are correctly accounted for and a successful result is achieved, a park can help to reduce separation rooted in social class, ethnicity, age or gender. Thus, in many countries, especially those with a lack of proper urban and green space planning, a variety of approaches to planning and decision-making regarding open spaces and urban parks is needed, especially when design styles from one location are borrowed to another with a very different culture, such as the French or English landscape styles being applied in other countries [20].

1.5. Vegetation Quality in Urban Parks

The fact that most urban parks provide green spaces with a greater or lesser proportion of their surface covered by vegetation is of course a major benefit at the city and site scales. At the city scale there is the role that park vegetation plays in many regulating ecosystem services such as mitigating the urban heat island effect. For example, in a meta-analysis, Gunawardena et al. [31] found that the evidence of the mitigating effects of combined green and blue spaces was greatest depending on the pattern of distribution. In a study in Tehran, the subject of this paper, Sodoudi et al. [32] found that two particular parks had a strong impact on local heat island mitigation. At the site scale there is also a micro-climate impact on users, primarily shade and shelter in different climate zones such as Mediterranean or desert [33,34]. The aesthetic qualities of vegetation can also be of great importance. This has most recently been evaluated by Jorgensen and Hitchmough [35], linking design aesthetics, restoration potential and biodiversity.

2. Urban Planning and Green Space in the City of Tehran, Iran

2.1. History of Park Development in Tehran

The ancient city of Tehran once consisted of a lot of small dispersed villages with large areas of gardens, forest and meadows separating them [36]. Now it is a large sprawling metropolis whose growth since 1970 has been fast and with little in the way of comprehensive planning of green spaces as an organised system [37]. Using parks and green space is, however, a major part of the Iranian culture, with a grand tradition of gardens dating back centuries to different Persian styles and heritage [10]. Within each of the 22 urban districts of the city there is a variety in amount and quality of parks; most of them are used and managed every day but resources are limited, demand is heavy and their condition varies considerably [38]. From 1960 until 1988, when a body responsible for green spaces was established by Tehran municipality, 154 parks were created, most of which were located in affluent neighbourhoods and were unevenly distributed. Until then, no planned activity concerning promotion, education, research or public participation in the field of urban green space had been carried out [38].

2.2. Policies of the City of Tehran towards Public Green Space

Owing to the unbalanced development of Tehran and its uncontrolled population growth, the existing green spaces were unable to satisfy citizens' needs. Thus, more parks were needed in order to meet a range of objectives: To strengthen human-nature relationships; to create safe, and accessible areas for different classes of society to spend their leisure time; to mitigate increasing air pollution, especially in winter when temperature inversions cause pollutants to be retained at ground level.

Due to rapid population growth and associated sprawl, some parts of Tehran have limited areas of public space available for the additional population. This restricts the equitable distribution of green spaces and other welfare facilities. To deal with the problem, the Tehran Parks and Green Space Organization (TPGSO) has a policy of purchasing land and changing its use in order to establish new public green spaces. However, this is opportunistic and depends on land coming on the market. So far it has resulted in 154 parks being created over 30 years.

Other current problems for parks management include the impact of the severe air pollution, in addition to the arid and semi-arid climate of Tehran, which imposes limitations on plant selection [38].

Furthermore, vandalism and other damage is caused to park facilities by some users; the TPGSO has therefore adopted the approach of planning with people instead of planning for people, through bottom-up collaborative planning. The TPGSO also tries to build a more park-friendly culture and to broaden citizen awareness of the importance of plants and green spaces using a range of media including radio/TV programmes, information signs and banners, educational pamphlets and by conducting awareness raising campaigns and training activities to broaden citizens' knowledge about park development [38].

However, while the aims and policies of the TPGSO are laudable, in practice the resources at its disposal and the data it has on which to base planning decisions are limited. In addition, the current distribution of parks is inequitable and major investments are needed in existing parks before being able to develop new ones. Finally, more information is needed on how people use parks so that the right parks can be planned in the right places [39].

3. Research Objective and Questions

The research presented here represents the second phase of an in-depth study of the parks of Tehran. The first phase, reported by Bahrini et al. [39] looked at the distribution of all parks in Tehran in relation to the demographic and structural setting of the city. Within this a subset of 16 parks, selected in areas with different socio-economic levels and urban structural context, was tested against the results of a space-syntax analysis (the term space syntax encompasses a set of theories and techniques for the analysis of spatial configurations to help urban planners simulate the likely social effects of their designs) and also population with access to each park living within different radii of each. This broad, city-wide picture concluded that there is no clear relationship between the location and quality of parks or their usage, meaning that there is a clear imbalance and inadequacy of provision, as already noted above. Phase three, to be reported separately (due to the constraints on what can be contained in a single papers) covers the perceptions and preferences of a sample of park users.

This study takes those same 16 parks and starts from where the previous research left off, delving in greater depth into each park in order to see what patterns emerge regarding their use. The focus here is on their design quality, condition and current patterns of use, so as to obtain a detailed picture of their current state. The study aims to answer the following research questions:

1. Why are some parks less used than others by some social groups?
2. How well do the existing parks provide for the people of Tehran?
3. What kinds of activities take place in the parks and what gaps in demand might there be?

4. Materials and Methods

4.1. Research Strategy

For this part of the research, a comparison of a large number of examples of parks within a single city, it was necessary to balance breadth with depth and to ensure a tight time frame for data gathering to ensure comparability. The methodological approach was to combine site assessments with observations of activities in each of the sampled parks. In many recent studies where behaviour observation has been applied, single or at the most two or three locations have been observed for considerable periods—sometimes several months—in order to build up a comprehensive picture with time depth. Given the resources available for this project it was necessary to sacrifice some of the depth in order to obtain more breadth, with shorter sampling times but all achieved within the same narrow seasonal time frame (see below).

4.2. Selection of the Sample Parks

As noted in Section 3, this study uses the same set of samples as the previous phase and as reported in [40]. The method of selecting the sites is summarised here once more. The 16 sample parks were chosen by consulting the 2008 Master Plan for the city of Tehran, with special reference to the “Typology (Clustering) of Neighbourhoods in Tehran” [41] which divided the city into socio-economic clusters. The sample parks were selected to be well-distributed across all socio-economic clusters. Table 1 summarises the character of each park and Figure 1 shows their location. The number of the cluster starts with 10 as the highest socio-economic districts down to 1, a district in the lowest socio-economic cluster. The types of park are also divided into neighbourhood parks—which are basically provided for and used by local residents—and destination parks, which attract people from

all over the city as a place to go for leisure as well as the local population. The destination parks tend to include many attractions which would not normally be found in a local park (see Table 1). Many destination parks are also found in districts with a higher socio-economic status.

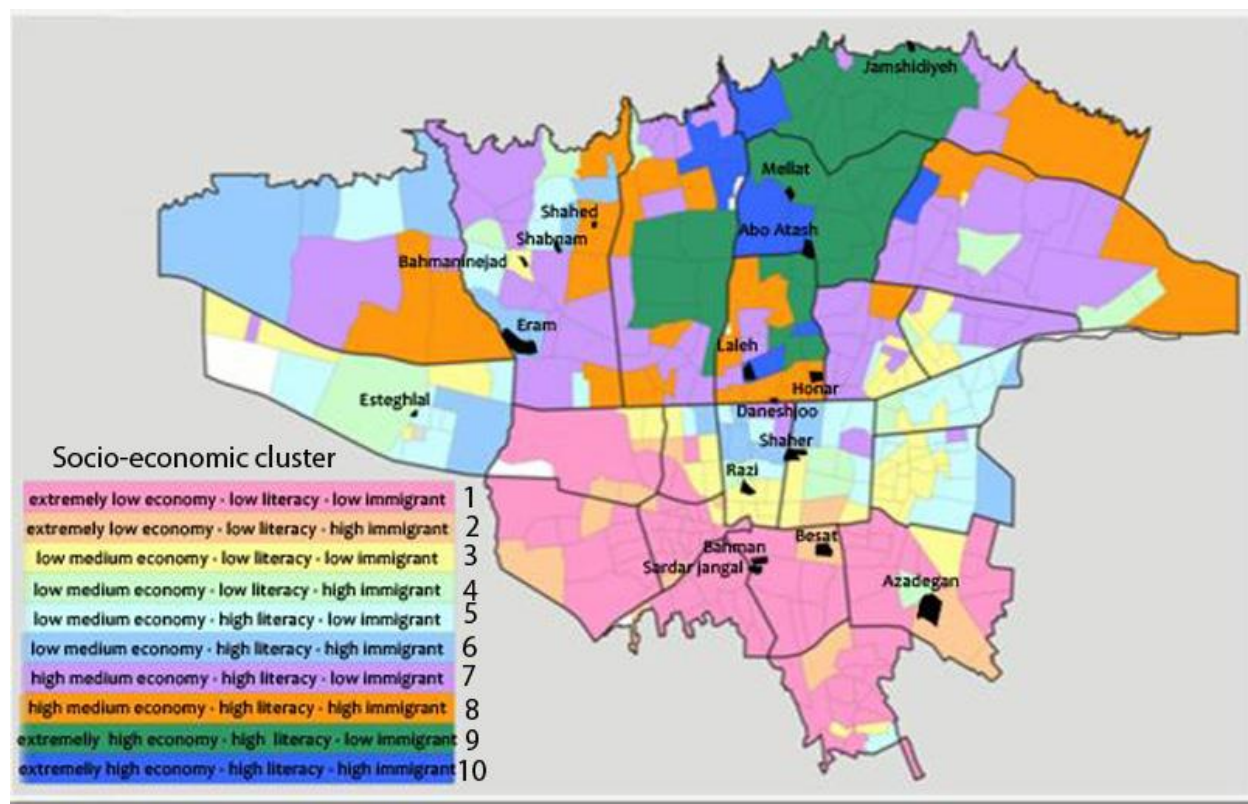


Figure 1. Location of the sample parks selected for the research by socio-economic cluster (based on data from Tehran municipality). The legend shows the lowest socio-economic cluster at the top (1) down to the highest at the bottom (10).

Table 1. Summary of the sample of parks used in the study.

Park Name	Socio-Economic Cluster	Year of Foundation	Total Area (ha)	Park Type and Main Facilities	Main Features of the Design, Main Trees Used and Estimated Proportions of Land Cover
Laleh	10	1967	28.0	A destination park with different and flexible areas for many activities	This park is well endowed with trees and contains some Japanese inspired sections. Types of trees: silver cedar, sycamore, oak, ginkgo, <i>siddalashjar</i> , acacia, maple, mulberry, bamboo, cedar, palm, elm, poplar, barberry.
Abo Atash	10	1999	6.5	A destination park with many recreational and commercial elements	This park includes many elements including a wide range of rocks and much use of concrete. It has low green cover. Types of trees: cypress, sycamore.

Table 1. Cont.

Park Name	Socio-Economic Cluster	Year of Foundation	Total Area (ha)	Park Type and Main Facilities	Main Features of the Design, Main Trees Used and Estimated Proportions of Land Cover
Mellat	9	1997	34.0	A destination park with a lake and many recreational facilities	The design is informal and in a style based on English parks. It is well-endowed with many different trees (120 types) including: Guelder rose, Tabrizi cedar, ash, yucca, plane, weeping willow, acacia, pine, elm, poplar, cypress.
Jamshidiyeh	9	1978	69.0	A destination park with lake, restaurant and open-air amphitheatre	The design of this park is in the traditional Iranian garden style with many trees. Types of trees: apricot, pear, cherry, weeping willow, black maple, ash.
Bagh Honar	8	1998	5.9	A destination park with many facilities and also hosting the Iranian Artist's forum.	The style of this park is a kind of eclectic fusion of English, Italian, French and Persian, and by combining these styles, a new art style has been created in the design of the park space. It is well-treed Types of trees include: cypress, elm, cedar, acacia, sycamore.
Shahed	8	2002	3.2	A local park with areas for ball games and children play	Design type: An informal style following free or natural forms (irregular and organic lines). Types of trees: acacia, cedar, elm, sycamore, sycamore, Egyptian silk, pine, magnolia, cedar, alder, yucca, barberry, eucalyptus, weeping willow.
Daneshjoo	7	1968	3.2	A destination park with a city theatre	The design of the park is formal and geometric in layout. Some of the types of trees: oak, olive, cypress, pine, plane, poplar,
Bahmaninejad	7	2002	3.2	A local park with ball games and children's play	Design type: An informal style following free or natural forms (irregular and organic lines). Some of trees: pine, sycamore, cypress.
Esteghlal	6	2008	1.3	A local park with a children's playground	Design type: using regular and organic lines. Some of trees: pine, sycamore, cypress.
Shahr	5	1961	25.0	A destination park with a lake, library and peace museum	This park is designed in a mix of Persian and French styles. Some of trees: pine, sycamore, cypress, poplar.

Table 1. Cont.

Park Name	Socio-Economic Cluster	Year of Foundation	Total Area (ha)	Park Type and Main Facilities	Main Features of the Design, Main Trees Used and Estimated Proportions of Land Cover
Razi	5	1998	25.7	A local park with lakes, a skate park, areas for ball games and children's recreational centre	Type of style: no specific style, very eclectic. It is well-treed. Types of trees include: acacia, sycamore, silver cedar, evergreen oak, ice flower, pine, cedar, apricot olive, eucalyptus, maple, sparrow, poplar, orchard, Tabrizi cedar, lilac, ash clove, ash, Judas tree, weeping willow.
Eram	4	1972	70.0	A destination park with different areas for a variety of activities and attractions	The design of this park has strong themes derived from Iranian literature, history, culture and indigenous art. Very low on tree cover Some of the trees: pine and sycamore.
Shabnam	3	1996	0.8	A local park with children play	This park is designed according to the concept of a traditional Iranian park. Some trees: a range of evergreen trees, sycamore.
Besat	2	1994	53.0	A destination park with amusements and commercial activities	The design of the park and the themed amusement elements is derived from Iranian culture. A larger water element is found here. Some of the trees: Judas tree, ash, poplar, elm, sycamore, cedar, alder, oak, acacia and pine.
Azadegan	2	2006	112.0	A destination park with flexible areas for different activities, a lake, ball game areas; popular with Afghan immigrants	This large park is designed in two styles one more formal and regular and one more organic and informal. It has 90 species of trees and shrubs, including broadleaf and coniferous, and 400 shrub species, the most common of which are eucalyptus, pine, mulberry, poplar, ash tree, weeping willow, olive, Tabriz, walnut, <i>voglia</i> , <i>shamshad</i> , <i>sidalashjar</i> , palm, alder, oak.
Sardar Jangal	1	2008	1.3	A local park with playground and women-only exercise area,	This park is designed according to the concepts of a traditional Iranian park. Some of the trees: a range of evergreen trees, sycamore.

The proportions of the land cover in each park is shown in Figure 1. It can be seen that paved open green areas are more-or-less similar across all parks and trees are the most important land cover in all except Abo-Atash, which is dominated by paving, and Eram which includes a fun fair occupying the majority of the space. Shrubs and water play incidental roles in the parks but water may be potentially relatively more important for users due to its attractive quality and role in cooling the air (see below Figure 2).

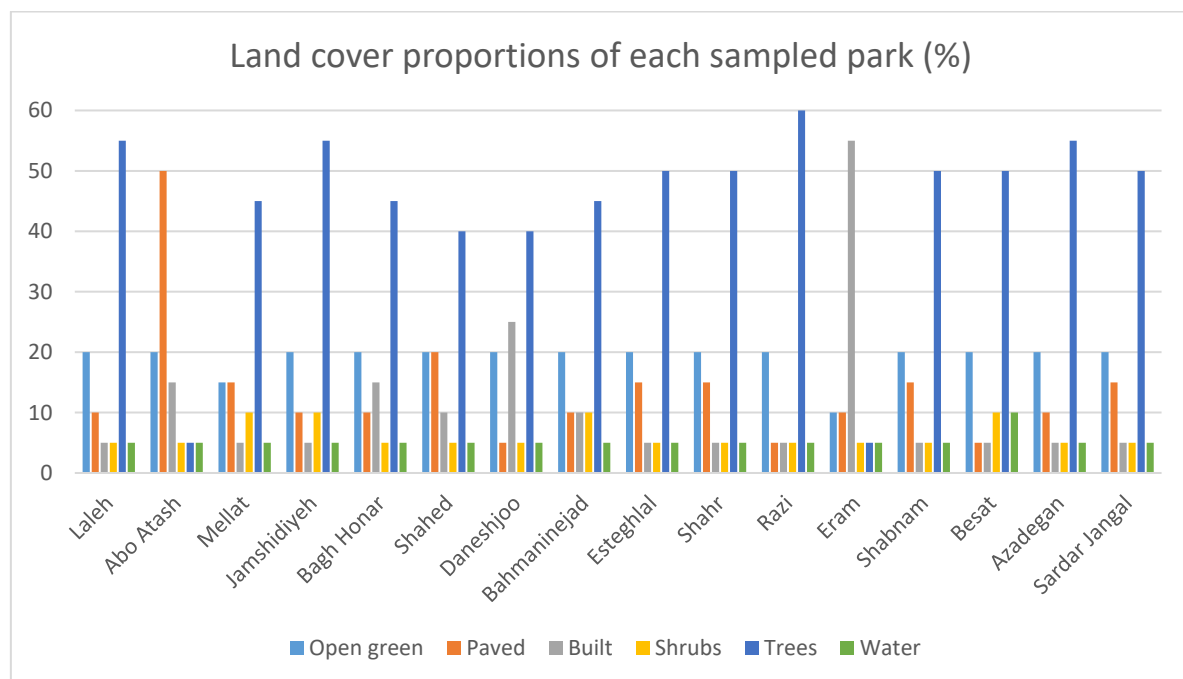


Figure 2. Land cover proportions of each park expressed as percentages.

4.3. Site Assessment

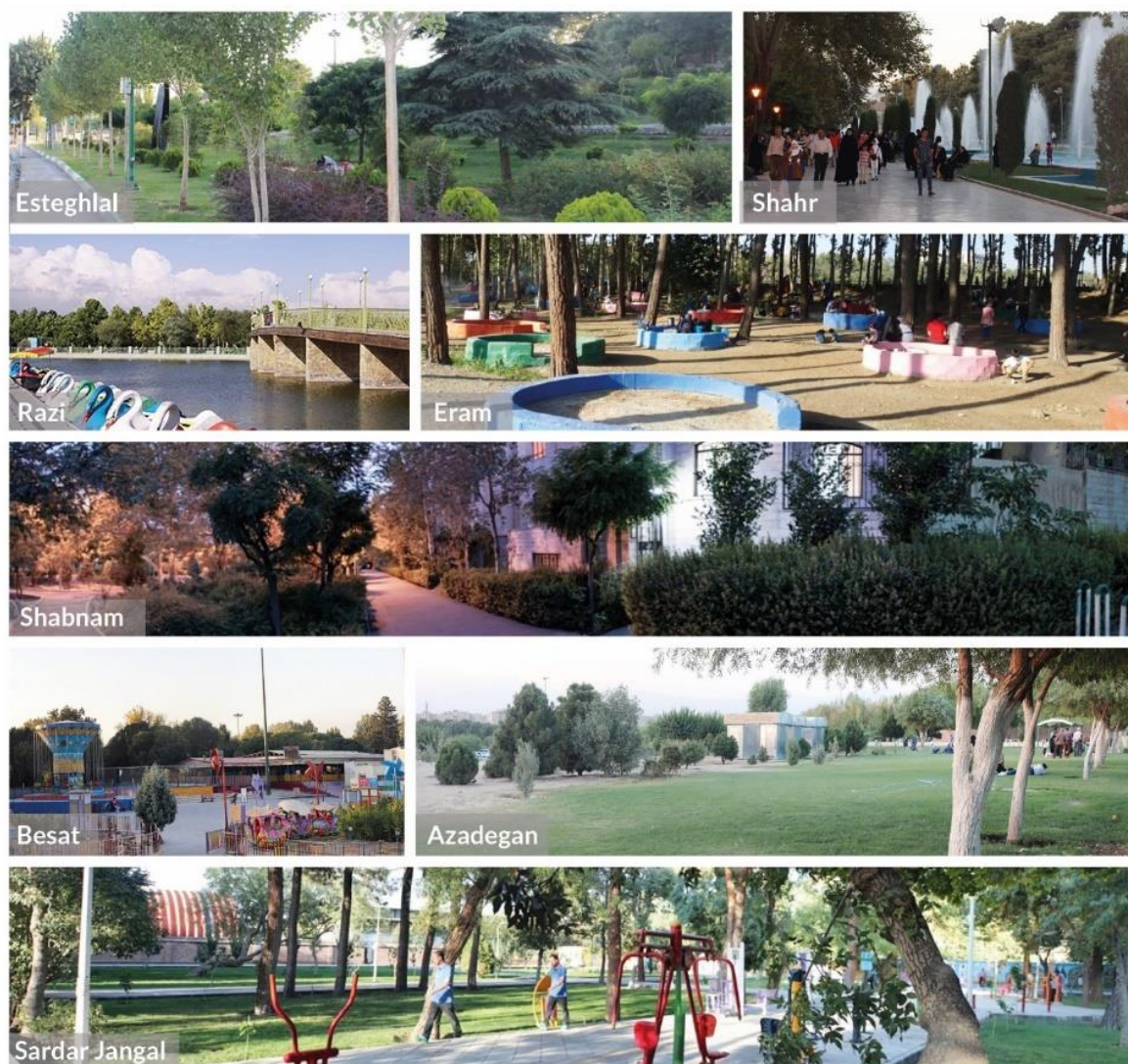
As part of the whole research project each park was assessed in terms of its level of use, range of activities, quality of maintenance, evidence of anti-social activities and the demographic character of their catchment and current patterns of use. Some of this data was embedded in the analysis of the park locations presented in the earlier study but this was primarily used for seeking correlations with the space syntax model and not for specific park assessment. In this paper an extended and adjusted dataset is examined in greater detail in relation to the observed use of each sample park in order to identify the strengths and weaknesses of each and to form an overall picture of the state of the parks for answering the research questions. Figure 3a,b present a selection of typical images of each sampled park.

To carry out the assessment we visited each park to: 1. Assess its physical condition and 2. to record the activities taking place and to note the estimated numbers and types of users. The period of assessment was July to September, the same period as for the observations (see below) in order to establish good relationships between condition and use patterns. The primary data collection took place in 2016 and was followed up with a further series of visits in summer of 2019 in order to check for consistency in the results and to note any changes that may have occurred.



a

Figure 3. Cont.



b

Figure 3. a,b: a. photos showing typical views of each sampled park (Source: the authors). Laleh Park: The swimming pool and water areas which attract many people for the cooling effect in the evening, at night, and generally out of office hours. Ab-o-Atash Park: The outdoor theatre is used at festival times, national celebrations and a space for gathering. Mellat park: The entrance of the park. Jamshidieh Park: The lake with its waterfall is one of the main attractions as it is attractive and cool. Bagh Honar park: The main green space which is also a sculpture garden. Shahed park: A very busy scene in this local park for the use of families. Daneshjoo park: the wide entrance of the park which is the busiest area because of the theatre. Bahmaninejad park: The entrance showing its tree-lined paths. b. Esteghlal park: a view along a path showing vegetation. Shahr park: the area with special facilities popular with visitors from all over the city. Razi: The boating lake popular in the evenings and at night. Eram: part of the zoo. Shabnam part of the path network and vegetation. Besat: The amusement park, which is open in the evenings. Azadegan: Part of the extensive green open spaces used for informal activities. Sardar Jangal: Some of the shade-bearing trees and fitness equipment.

4.4. Site Physical Condition Assessment

We assessed each park qualitatively using a five-point rating scale (where 1 was the lowest value and 5 was the highest value), so that we could compare each sampled park numerically, using the following criteria based on those of Golkar [42].

- *Accessibility to and within the park*, whether easy to get there and then how easy to move around within the park (very easy to very difficult).
- *The level of management and maintenance*, meaning a combination of the overall management of the park and the maintenance of surfaces, vegetation, litter collection etc. (very well managed to very poorly maintained).
- *The range of activities* being pursued, whether formally provided for or spontaneously carried out (very busy to very quiet).
- *Evidence of anti-social behaviour* such as vandalism, litter, graffiti etc. (very much to very little).
- *Permeability and movement*: The degree of freedom of movement within the site using paths or crossing open areas (very free and permeable to very restricted).
- *Inclusiveness*: how well the design provides for all gender and age groups or groups with various disabilities, such as surfaces and seating etc. (very inclusive to very restricted).
- *The quality of public areas*: The overall functionality and suitability of facilities and outdoor furniture, public art, etc. (very good to very poor).
- *Climate comfort*: Environmental considerations: Areas exposed to sun, degree of shade, air currents and prevailing winds, vegetation, air and noise pollution.
- *Lighting*: Important in the evenings since this is a popular time for park use (well-lit to poorly lit with dark areas).
- *Vegetation*: The quality of the vegetation—its use in the design and its condition (very good to very poor).
- *Flexibility*: The capability of adaptation of a place for different activities (very flexibly to inflexible).
- *Vitality*: The overall sense of liveliness and popularity of the park—simultaneously the cause and effect of all other qualities (full of vitality to low in vitality).
- *Safety and security*: The overall sense of how safe and secure the site is, e.g., policing, surveillance, visibility etc. (very safe and secure to not very safe and secure).

Score sheets with spaces for notes were used to enter the data after a general walk around each site gave an initial impression. Specific aspects were also noted on each form. The data were then entered into an Excel spreadsheet for further analysis. Spidergrams were used to present the scores in a clearly understandable graphical manner, where the strengths and weaknesses could be seen in relation to each other. In order to test the relationships among the factors a series of correlations was also carried out. Owing to the low sample size and presence of ranked data (because of the scoring method used in the data collection) we used the Spearman correlation (2-tailed).

4.5. Activity Assessment

A single assessor carried out all the field work (the main author of the study). Although it may be considered that bias may be introduced when collecting data using only one person, because the results are for relative comparison and there are no absolute measurements, we consider that there is no problem with calibrating for inter-rater reliability, for example, which can be a problem where multiple assessors are employed. During the field work each site was visited several times at different hours of the day over different weekdays for a period of around 5 hours: Early morning, middle of the day, late afternoon, and evening. While walking around each site or stopping at a point from where all or a large proportion of it could be seen at once, all activities during that time were recorded as notes on a map and the relative popularity of each activity was also recorded. The weather, time of day and day of the week was also noted. The raw maps were used to prepare a database describing the main activities in relation to the places within each park where they took place and with the numbers of activities summarised to show the relative popularity of each, also related to gender and age group. These data were then normalised into proportions in a 1-5 scale, where 5 is the greatest amount of activity and 1 the least, so that comparative graphs and some statistical analyses could be conducted.

The survey method was pilot tested in late 2015 to ensure that all relevant aspects were captured, that it was feasible to do it and that the surveyor did not attract any unwanted attention (as the surveyor was female and public spaces are under considerable surveillance in a Muslim country). The main data collection was conducted in July, August and September 2016. The main outdoor season for use of urban parks in Iran starts in July, in summer, when temperatures are high and the shade offered by trees is demanded. It also coincides with the period when school and university students are on holiday and families are free to go outside and do various activities together.

5. Results

The results are presented first for the site assessments for all the parks, together with correlations of the factors embedded within this analysis. The second part presents the results of the observations for all the parks, using descriptive statistics and some further correlations, after which the condition and use are compared.

5.1. Site Assessment of the Sampled Parks and Their Relationship to Other Factors

Table 2 shows the scores given to each of the sampled parks according to the criteria used in the site assessment, presented as spidergrams with a summary of the main findings for each. Correlations were calculated between each variable (Table 3) to see what relationship exist.

Table 2. Results of the site assessments for each park.

Park	Results of the Site Assessment	Main Findings
Laleh		This park is in one of the oldest districts of the city and close to the most important student centres in Iran. It scores well for the variety of activities and lacks any antisocial problems; otherwise it scores in the middle of the range and there are many aspects which could be improved.
Abo Atash		This park high scored highly in many areas, especially in the quality of the public areas, the level of maintenance, variety of activity and vitality, with correspondingly low levels of anti-social activity. The weaknesses were in the amount and quality of vegetation and the climate comfort – suggesting that there is insufficient shade which could limit the usability of parts of the park at certain times of day. Other aspects were also satisfactory but could be improved.
Mellat		This park scores highly in many key attributes. The overall quality of the public areas is high and the maintenance, lack of antisocial activities, sense of security and variety of activities are all connected with making it a successful park. A weakness is the climate comfort – reflected in the low score for vegetation cover and quality. Other factors are adequate although they could be improved. This park is considered to be one of the main attractions of the city of Tehran.

Table 2. Cont.

Park	Results of the Site Assessment	Main Findings
Jamshidieh		This is a well-established popular park, located in the so-called uptown area of the city, where higher socio-economic classes live. It is free from antisocial activities, has good, mature vegetation and is one of the few parks with good lighting. It is well-maintained and generally scores fairly well on other dimensions.
Bagh Honar		This park is well-known because it includes a popular art centre in its territory. The level of the use is high, with a wide range of activities. While located in a low socio-economic level district, most of the visitors are of a higher, well-educated social class. It only scores highly for maintenance and vitality. It is free of anti-social activities. There are a number of areas for improvement.
Shahed		This is a well-maintained park with an absence of anti-social activities but otherwise scores in the middle of the range and has potential to be improved.
Daneshjoo		This park lies in a deprived area with a low population density but is also the site of a major city theatre. It has good accessibility and vitality but only moderate scores for everything else. Security is relatively poor for a place with an important theatre.
Bahmaninejad		This is a small-scale local park, and is very green. There is little antisocial activity present but maintenance is poor, as is lighting and access with a low sense of security as a result.
Esteghlal		This small, local park on local scale, remote from the main core of the city suffers from many problems, these being a combination of poor maintenance, poor accessibility, a high level of anti-social activity, poor spatial quality and thus a low sense of security. The vegetation is good here.

Table 2. Cont.

Park	Results of the Site Assessment	Main Findings
Shahr		This park is the first steps in converting an Iranian garden into a public park. It is located in the lower part of the city in an area of lower social class. The park has many problems, foremost being poor maintenance, a low sense of security and many antisocial activities. Lighting is also poor but the vegetation is very good and the climate comfort is better than in many other parks due to the shade provided by the trees.
Razi		This park has access problems owing to its distance from where people live. It has poor lighting and a degree of antisocial activity leading to a feeling of a lack of security. Most other aspects are middle of the range with only climate comfort being good.
Eram		This park contains Eram Zoo, the largest zoo in Iran, which is popular with large numbers of people both during the week and during holidays and weekends. It scores highly for vitality and variety of activities and has no anti-social activity problems. Otherwise it scores less well, especially for vegetation and rather poorly for climate comfort and the level of maintenance.
Shabnam		This is regarded as a small-scale local park and it scores poorly in many aspects. While antisocial activities are not significant, the low quality of maintenance and poor lighting mean it feels less secure. It is secure due to the presence of local people at different times of the day. The vegetation creates good shade but it is not very inclusive and has few opportunities for activities. It is in need of a major upgrade.
Besat		This is a regional park located adjacent to the southern boundary of the city and used by visitors from out of the city. It has good accessibility and rich vegetation but poor vitality, inadequate lighting and all other aspects fall in the middle of the range.

Table 2. Cont.

Park	Results of the Site Assessment	Main Findings
Azadegan		<p>Azadegan Park in a low socio-economic, deprived district, despite its large size and its planning as a metropolitan parkland. The current activities in this park are fairly diverse, but it has poor access due to its location. The level of security is low and it is poorly maintained, has low levels of lighting, and quite a lot of antisocial activity. Vegetation is good and climate comfort is also good, due to the shade provided by the trees.</p>
Sardar Jangal		<p>This park is a local one with a children's play area and also a women-only exercise area. It scores moderate to low for most of the factors except accessibility, which is very good. It is notably poor in vitality, quality of public areas and lighting.</p>

In the statistical analysis of the rating results using the Spearman Correlation we found a number of interesting and important relationships which suggest some key reasons why some places are more vital and better used than others, the highlights of which are as follows. The level of management and maintenance is significantly positively correlated to almost all of the variables except evidence of anti-social activity (significantly negatively correlated), permeability of movement, a factor of site layout, climate comfort, also a factor independent of management or maintenance, vegetation quality (not associated with management and maintenance as defined in the rating system) and flexibility (a spatial aspect). This is an important finding, in line with many other studies which identify good management and maintenance as attracting users and in places feeling welcoming and safe.

There was a significant positive correlation between the degree of lighting and all factors except for evidence of anti-social activities (a significant negative correlation) and climate comfort, flexibility, vegetation quality and vitality. This is also an important finding since most parks, as noted below, tend to be used in most in the evenings and at night when it is dark. Safety and security are also strongly correlated with many of the factors, apart from climate comfort and vegetation quality suggesting that these are important for encouraging use of parks, also much in line with other research and experience.

There was a further positive correlation between the range of activities and vitality, security, inclusiveness, lighting, and permeability and movement, although significantly negatively correlated with vegetation—perhaps because dense planting prevents some activities. This suggests that parks with a variety of activity and movement are more alive and more welcoming and inclusiveness.

The quality of the public area found to be negative significantly correlated with the presence of anti-social activities, suggesting that attractive places attract less anti-social activity, perhaps because they are more popular. Quality of the public areas was otherwise significantly positively correlated with permeability and inclusiveness as well as vitality.

Table 3. Spearman correlation of all the factors of assessment of the parks.

	Accessibility to and within the Park	Level of Management and Maintenance	Range of Activities	Evidence of Anti/Social Behaviour	Permeability and Movement	Inclusive-Ness	Quality of Public Areas	Climate Comfort	Lighting	Vegetation Quality	Flexibility	Safety and Security	Vitality
Accessibility to and within the park	1	0.690 **	0.429	−0.245	0.257	0.43	0.131	0.159	0.517 *	−0.026	0.259	0.634 **	0.46
.		0.003	0.097	0.361	0.336	0.096	0.628	0.557	0.04	0.922	0.333	0.008	0.073
Level of management and maintenance	0.690 **	1	0.745 **	−0.600 *	0.458	0.736 **	0.504 *	0.25	0.753 **	−0.298	0.456	0.894 **	0.802 **
	0.003	.	0.001	0.014	0.074	0.001	0.047	0.35	0.001	0.262	0.076	0	0
Range of activities	0.429	0.745 **	1	−0.459	0.566 *	0.852 **	0.459	0.012	0.673 **	−0.558 *	0.734 **	0.809 **	0.679 **
	0.097	0.001	.	0.074	0.022	0	0.074	0.965	0.004	0.025	0.001	0	0.004
Evidence of anti/social behaviour	−0.245	−0.600 *	−0.459	1	−0.378	−0.454	−0.572 *	0.293	−0.698 **	0.304	−0.118	−0.636 **	−0.489
	0.361	0.014	0.074	.	0.149	0.077	0.021	0.271	0.003	0.252	0.664	0.008	0.055
Permeability and movement	0.257	0.458	0.566 *	−0.378	1	0.807 **	0.666 **	0.355	0.519 *	−0.358	0.630 **	0.543 *	0.597 *
	0.336	0.074	0.022	0.149	.	0	0.005	0.177	0.039	0.173	0.009	0.03	0.015
Inclusive-ness	0.43	0.736 **	0.852 **	−0.454	0.807 **	1	0.662 **	0.327	0.717 **	−0.492	0.750 **	0.792 **	0.776 **
	0.096	0.001	0	0.077	0	.	0.005	0.217	0.002	0.053	0.001	0	0
Quality of public areas	0.131	0.504 *	0.459	−0.572 *	0.666 **	0.662 **	1	0.346	0.629 **	−0.22	0.588 *	0.574 *	0.643 **
	0.628	0.047	0.074	0.021	0.005	0.005	.	0.189	0.009	0.414	0.017	0.02	0.007

Table 3. Cont.

	Accessibility to and within the Park	Level of Management and Maintenance	Range of Activities	Evidence of Anti/Social Behaviour	Permeability and Movement	Inclusive-Ness	Quality of Public Areas	Climate Comfort	Lighting	Vegetation Quality	Flexibility	Safety and Security	Vitality
Climate comfort	0.159	0.25	0.012	0.293	0.355	0.327	0.346	1	−0.075	0.313	0.405	0.135	0.245
	0.557	0.35	0.965	0.271	0.177	0.217	0.189	.	0.783	0.238	0.119	0.617	0.36
Lighting	0.517 *	0.753 **	0.673 **	−0.698 **	0.519 *	0.717 **	0.629 **	−0.075	1	−0.446	0.349	0.834 **	0.840 **
	0.04	0.001	0.004	0.003	0.039	0.002	0.009	0.783	.	0.084	0.185	0	0
Vegetation quality	−0.026	−0.298	−0.558 *	0.304	−0.358	−0.492	−0.22	0.313	−0.446	1	−0.371	−0.487	−0.452
	0.922	0.262	0.025	0.252	0.173	0.053	0.414	0.238	0.084	.	0.157	0.056	0.079
Flexibility	0.259	0.456	0.734 **	−0.118	0.630 **	0.750 **	0.588 *	0.405	0.349	−0.371	1	0.578 *	0.535 *
	0.333	0.076	0.001	0.664	0.009	0.001	0.017	0.119	0.185	0.157	.	0.019	0.033
Safety and security	0.634 **	0.894 **	0.809 **	−0.636 **	0.543 *	0.792 **	0.574 *	0.135	0.834 **	−0.487	0.578 *	1	0.803 **
	0.008	0	0	0.008	0.03	0	0.02	0.617	0	0.056	0.019	.	0
Vitality	0.46	0.802 **	0.679 **	−0.489	0.597 *	0.776 **	0.643 **	0.245	0.840 **	−0.452	0.535 *	0.803 **	1
	0.073	0	0.004	0.055	0.015	0	0.007	0.36	0	0.079	0.033	0	.
N	16	16	16	16	16	16	16	16	16	16	16	16	16

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.2. Results of the Activity Assessments at Each Park

In this section we present some descriptive statistics to compare various aspects of the parks in relation to key variables after which we present some correlations in order to explore the associations between them. More detailed qualitative descriptions of the main aspects observed can also be found in Appendix A.

5.2.1. Amount of Use of Each Park by Population Type

Figure 4 presents the relative amounts of use of each park divided into that of men, women and children. The parks to the left of the x -axis are those in higher socio-economic clusters, descending to the lowest to the right. It can be seen that the higher-level parks are popular with everyone and there is no real difference, although some such as Laleh are less busy. However, it is clear that in several parks, especially those in the lower classes, many more men use them than women: Daneshjoo and Razi standing out in this respect. The odd one out is Sardar Jangal, where more women than men use it. Children are also found to use parks (taken by parents) as much as adults in some cases (destination parks) and more than women in some, such as Daneshjoo, Razi and Azadegan.

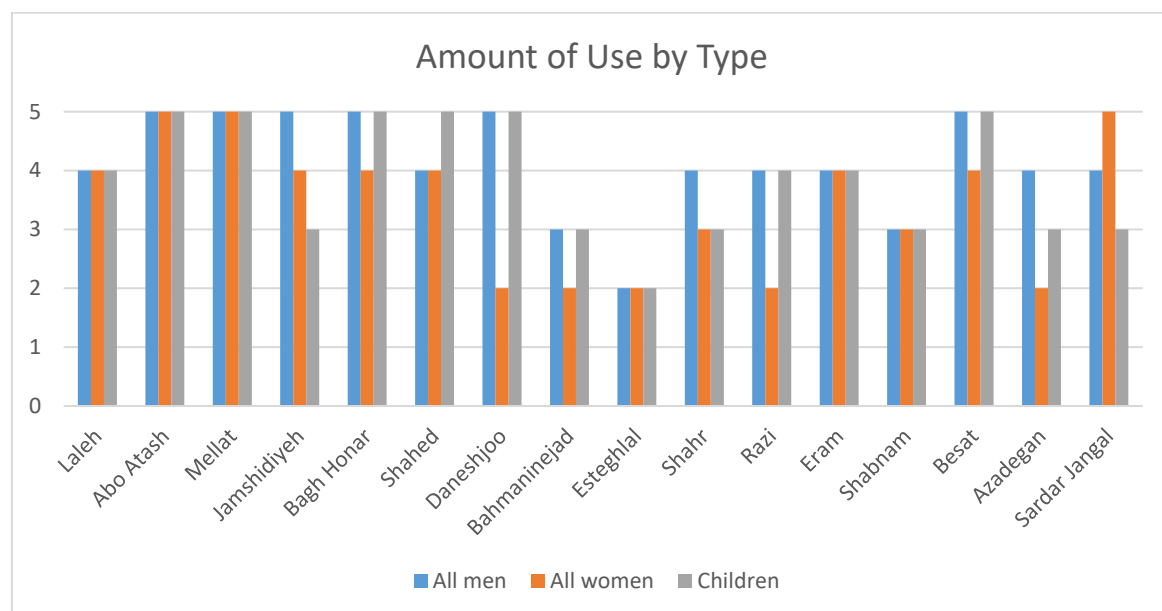


Figure 4. Relative amount of use of each park in the sample categorised by gender and children.

5.2.2. Usage at Different Times of the Day

It is known that parks are used at different times of the day by different people and that in Iran, evenings and the night-time are among the most popular times. Figure 5 shows the pattern of use of the sampled parks. From this we can see that only a few parks such as Abo Atash and Mellat, are relatively well-used all day, some such as Laleh, Mellat, Jamshidiyeh, Bagh Honar and Bahmaninejad are popular in the morning more than in the middle of the day, while the rest tend to be mostly used in the evenings and night-time.

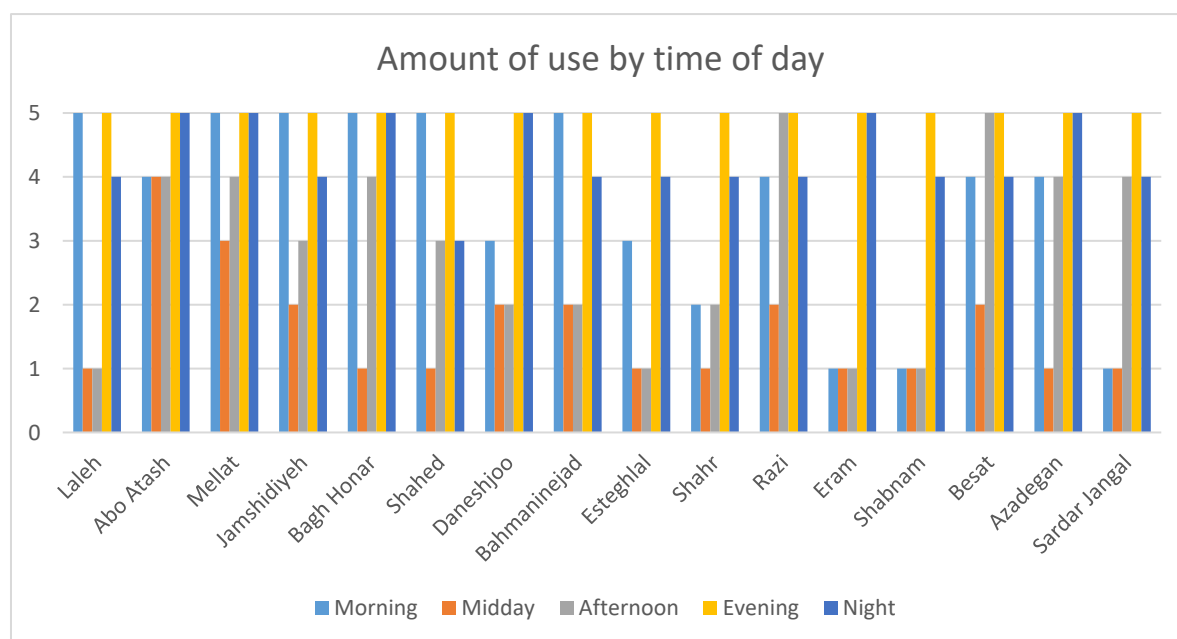


Figure 5. The relative amounts of use of each park according to the time of day proportionate to the total amount of use.

5.2.3. Amount of Use of Different Landscape in the Parks

We were also interested to see what kind of landscape elements are mainly used by visitors. Figure 6 shows the relative amounts for each park proportionate to the total amount of use. We can see that, as might be expected, paths and surfaced areas account for a lot of use while lawns if present are also popular—for playing and sitting. Trees are always important, depending on how well-treed the park is—for shade in the daytime we assume. Water features, when present, even though they usually occupy very small proportions of the parks, are also very popular places to be.

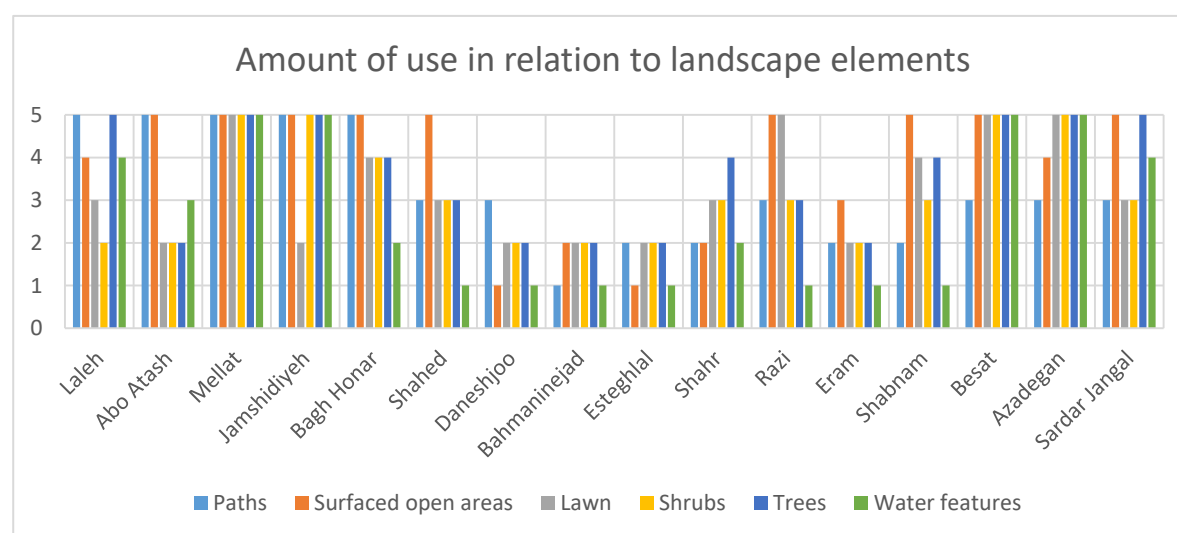


Figure 6. The relative amounts of use of each park according to the different landscape elements, proportionate to the total amount of use.

5.2.4. Amount of Different Activities in Each Park

Figure 7 shows the relative proportions of different activities taking place in each park, proportionate to the total amount of use. Walking is generally one of the most popular activities,

as might be expected. Standing was observed to be a significant use in some parks such as Abo Atash, Razi and Eram. Cycling is hardly found at all—Iran is not known for being cyclist friendly. Sitting is also a common use. Jogging is quite popular, especially in Mellat, Bagh Honar, Esteghlal (comparatively since this park has slow usage), and Razi. Picnicking is also extremely popular with some parks, such as Shahed, Eram, Besat, Azadegan and Sardar Jangal being dominated by it—all but Eram being in the lower socio-economic districts.

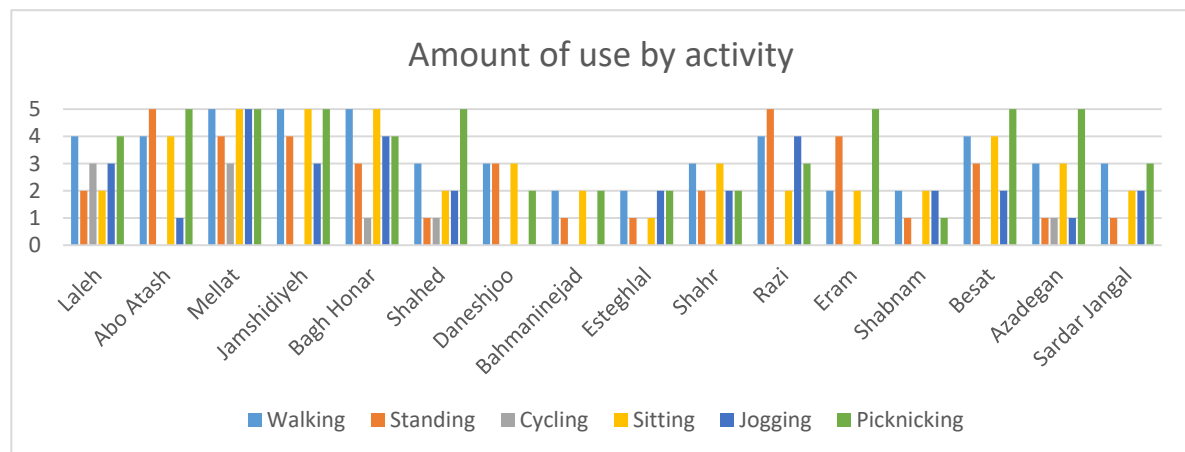


Figure 7. The relative amounts of use of each park according to the different activities recorded, proportionate to the total amount of use.

When it comes to children's play and games and sports, all parks are used well in proportion to the overall amount of use as shown in Figure 8. There is only one park where there is no sport activity: Abo Atash, where there is no sports field or open area suitable for games. There are some differences too, with play or games and sports being slightly less popular but these are marginal.

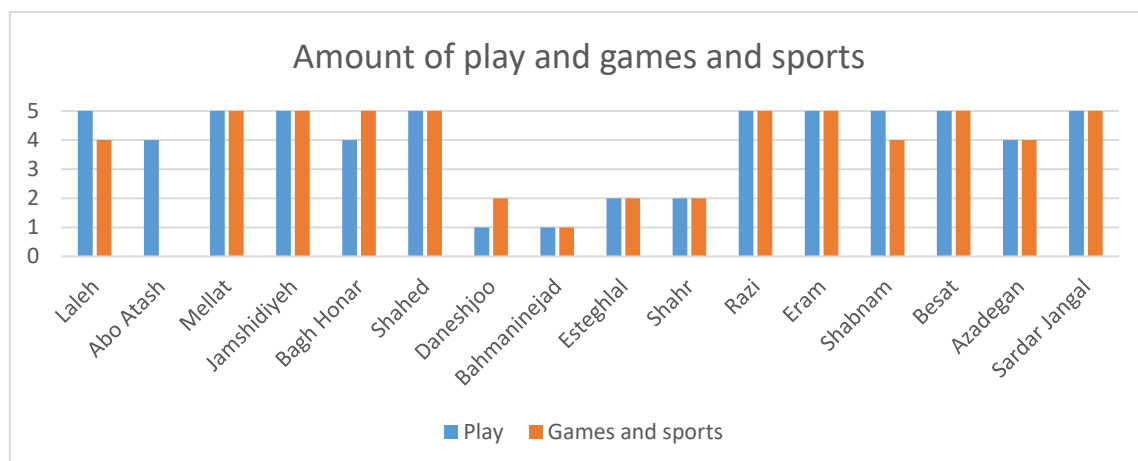


Figure 8. The relative amounts of use of each park for play and games and sport according to the different activities recorded, proportionate to the total amount of use.

5.2.5. Correlation between Time of Day and Use by Different Gender

Table 4 shows the results of two-tailed Spearman correlation run between time of day and men, women and children. The only significant positive correlation is between men for spending time in parks at midday and afternoon. This suggests that when we see the amount of use of parks at these times as illustrated in Figure 5 this is most likely to be men as opposed to women and children, while at other times it can be any mix of the three types.

Table 4. 2-Tailed Spearman correlation between time of day and amount of use by gender/children. Yellow highlights the significant results.

		All Men	All Women	Children
Morning	Correlation Coefficient	0.338	0.143	0.362
	Sig. (2-tailed)	0.201	0.597	0.169
Midday	Correlation Coefficient	0.559 *	0.169	0.428
	Sig. (2-tailed)	0.024	0.531	0.098
Afternoon	Correlation Coefficient	0.558 *	0.269	0.427
	Sig. (2-tailed)	0.025	0.314	0.099
Evening	Correlation Coefficient	0.224	0.166	0.257
	Sig. (2-tailed)	0.043	0.558	0.038
Night	Correlation Coefficient	0.486	0.123	0.35
	Sig. (2-tailed)	0.056	0.651	0.184
	N	16	16	16

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.2.6. Correlation between Activities and Landscape Elements

Table 5 shows the results of a 2-tailed Spearman correlation between activities and landscape elements. It shows that, firstly, paths are associated with every activity except play, water-based and horse-riding. Jogging is most likely to be done anywhere in the park. Walking is associated with everywhere except, curiously, lawns and as would be expected, games pitches and play areas. Play also takes place in many elements but is not significantly associated with play areas.

Table 5. 2-tailed Spearman correlation of activities with landscape elements. Yellow highlights the significant results.

		Paths	Surfaced Open Areas	Lawn	Shrubs	Trees	Water Features	Games Pitches	Children's Play
Walking	Correlation Coefficient	0.904 **	0.592 *	0.373	0.555 *	0.533 *	0.654 **	0.476	0.169
	Sig. (2-tailed)	0	0.016	0.155	0.026	0.034	0.006	0.062	0.531
Standing	Correlation Coefficient	0.514 *	0.3	0	0.076	−0.08	0.183	0.269	0.233
	Sig. (2-tailed)	0.041	0.259	1	0.78	0.767	0.498	0.313	0.385
Cycling	Correlation Coefficient	0.541 *	0.196	0.45	0.301	0.45	0.364	0.46	0.181
	Sig. (2-tailed)	0.031	0.468	0.08	0.258	0.08	0.166	0.073	0.503
Sitting	Correlation Coefficient	0.654 **	0.395	0.234	0.618 *	0.399	0.658 **	0.21	0.208
	Sig. (2-tailed)	0.006	0.13	0.383	0.011	0.126	0.006	0.435	0.439
Jogging	Correlation Coefficient	0.567 *	0.567 *	0.547 *	0.532 *	0.565 *	0.358	0.569 *	−0.028
	Sig. (2-tailed)	0.022	0.022	0.028	0.034	0.023	0.174	0.021	0.917
Picnicking	Correlation Coefficient	0.576 *	0.458	0.175	0.43	0.33	0.583 *	0.444	0.204
	Sig. (2-tailed)	0.019	0.074	0.517	0.096	0.211	0.018	0.085	0.449
Play	Correlation Coefficient	0.335	0.713 **	0.42	0.398	0.539 *	0.301	0.717 **	0.146
	Sig. (2-tailed)	0.205	0.002	0.105	0.126	0.031	0.257	0.002	0.589
Games and sports	Correlation Coefficient	0.566 *	0.821 **	0.408	0.552 *	0.417	0.349	0.802 **	0.371
	Sig. (2-tailed)	0.028	0	0.131	0.033	0.122	0.202	0	0.174
Water play	Correlation Coefficient	0.324	0.217	−0.29	−0.29	−0.32	0.089	−0.115	0.087
	Sig. (2-tailed)	0.221	0.42	0.272	0.268	0.223	0.744	0.672	0.75
Horse riding	Correlation Coefficient	0.324	0.217	−0.29	−0.29	−0.32	0.089	−0.115	0.087
	Sig. (2-tailed)	0.221	0.42	0.272	0.268	0.223	0.744	0.672	0.75
N		16	16	16	16	16	16	16	16

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.2.7. Correlation between Park Characteristics and Amount of Use by Gender/Children

Since the analysis of the park assessment results showed an association between key factors such as levels of management and maintenance and evidence of anti-social activity, we ran a correlation to see if there was an association of some of these factors with amount of use, especially by gender. Table 6 shows that use by all users is associated positively with level of management and maintenance, inclusiveness (not a significant one for women), lighting and safety and security but only women show a negative correlation with evidence of anti-social behaviour. This suggests that signs of anti-social behaviour deter women from visiting such parks.

Table 6. 2-tailed Spearman correlation of key park features with amount of use by different groups. Yellow highlights the significant results.

		All Men	All Women	Children
Level of management and maintenance	Correlation Coefficient	0.756 **	0.510 *	0.825 **
	Sig. (2-tailed)	0.001	0.043	0
Evidence of anti/social behaviour	Correlation Coefficient	−0.29	−0.715 **	−0.294
	Sig. (2-tailed)	0.276	0.002	0.27
Inclusiveness	Correlation Coefficient	0.547 *	0.476	0.647 **
	Sig. (2-tailed)	0.028	0.062	0.007
Lighting	Correlation Coefficient	0.615 *	0.608 *	0.511 *
	Sig. (2-tailed)	0.011	0.012	0.043
Safety and security	Correlation Coefficient	0.716 **	0.700 **	0.825 **
	Sig. (2-tailed)	0.002	0.003	0
	N	16	16	16

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.2.8. Correlation between Socio-Economic Level and Park Characteristics

Given the importance attached to the division of the city into different socio-economic classes, we correlated this factor (classifying the 10 levels into three classes of high, medium and low) against the park characteristics. We found positive correlations between level of management and maintenance, the range of activities available, the degree of inclusiveness (Table 7), and with lighting and vitality (Table 8). This means that the positive correlations are associated with parks in the higher socio-economic clusters while anti-social behaviour is associated with parks in the lower socio-economic clusters.

Table 7. 2-tailed Spearman correlation of socio-economic class with the first 6 key park features. Yellow highlights the significant results.

		Accessibility to and within the Park	Level of Management and Maintenance	Range of Activities	Evidence of Anti-Social Behaviour	Permeability and Movement	Inclusiveness
Socio-economic level	Correlation Coefficient	0.496	0.752 **	0.605 *	−0.682 **	0.322	0.579 *
	Sig. (2-tailed)	0.051	0.001	0.013	0.004	0.223	0.019
	N	16	16	16	16	16	16

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

Table 8. 2-tailed Spearman correlation of socio-economic class with the remaining 5 key park features. Yellow highlights the significant results.

		Accessibility to and within the Park	Climate Comfort	Lighting	Vegetation Quality	Flexibility	Vitality
Socio-economic level	Correlation Coefficient	0.496	−0.132	0.733 **	−0.399	0.228	0.624 **
	Sig. (2-tailed)	0.051	0.625	0.001	0.126	0.397	0.01
	N	16	16	16	16	16	16

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

5.2.9. Correlation of Park Management and Maintenance with Type and Prevalence of Activities

In a final analysis we explored the relationship between the degree of management and maintenance and the prevalence of different activities (Table 9). This showed a positive correlation for all activities except jogging, play and water play and horse riding (which is only found in one park in a special *manège*). These last two items have been removed from the table due to space limitations. This suggests that more activities in general take place in parks with better management and maintenance—which also happen to be those in higher socio-economic clusters and often the destination parks.

Table 9. 2-tailed Spearman correlation of the level of management and maintenance with the types of activities carried out in the parks. Yellow highlights the significant results.

		Walking	Standing	Cycling	Sitting	Jogging	Picnicking	Play	Games and Sports
Level of management and maintenance	Correlation Coefficient	0.713**	0.531*	0.582*	0.619*	0.305	0.647**	0.222	0.523*
	Sig. (2-tailed)	0.002	0.034	0.018	0.011	0.251	0.007	0.408	0.045
	N	16	16	16	16	16	16	16	15

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed).

6. Discussion

As urban parks in cities have grown, designers and city planners should investigate how various park characteristics affect park users and with attention to this matter they can increase people's social lives and well-being of users in future design.

The main design elements in the 16 parks we investigated (Table 1) were green open areas which often accounted for around 20% of the space, paved areas which ranged from 5%–15% depending on the design, trees and vegetation which normally accounted for around half or more of the park, although in different configurations, and water spaces—usually around 5%. In addition, there were specific sitting spaces, running spaces, playgrounds, food concessions and picnicking spaces (detailed in Appendix A). We found, in line with other studies, that factors of accessibility, lighting, security, permeability and movement, inclusiveness, vitality, evidence of anti-social activities, quality of management and maintenance, flexibility, the range of activities are all important to varying degrees. All these elements depend to each other and work together so all these criteria should fit the needs of future users and design can be implemented to focus on the most important criteria to improve the quality of life of local users. We found that safety and security are important—and that those parks judged to have lower sense of this and also a presence of anti-social behaviour are less-well used, especially by women (see

Table 6). We found that a combination of factors concerning the quality of the parks such as how well maintained and safe they are, has a lot to do with their level of use and that this is also related to the location—in districts with higher socio-economic class management and maintenance was generally better and there was less evidence of anti-social activities.

The amount of use per park varies quite a lot, with the destination parks in higher socio-economic districts being very popular and some in the lower socio-economic areas being less well-used overall. One key pattern to emerge is the fact that all parks are well-used by men, but some are much less-well used by women (Figure 4). The patterns of use according to the time of day also show distinct patterns, with evening and night-time being the most popular (Figure 5). The correlation in Table 4 shows that men are most likely to use parks at any time of day and are more associated with using them in the mornings and at noon.

The main activities undertaken are walking, sitting, picnicking (very popular), children's play and sports. Jogging is quite popular but cycling is hardly to be seen. Activities seem to be well-distributed according to the land cover, sometimes focused on surfaced areas (especially paths) as opposed to being within the trees (where there is more shade) but given the main use being in the evening and at night shade is less of an issue and dark places among trees may feel a lot less safe (see further aspects below).

The parks forming the sample of research vary quite a lot in the size and the facilities present (Table 1), some, being more destination parks than local neighbourhood parks (such as Laleh, Abo Atash, Jamshidiyeh or Besat), contain entertainment attractions (restaurants, zoos, amusement parks, theatres or museums) which are attended by visitors from all over the city. Some of these are in poorer areas and the park territory away from the attractions may be in less good condition or less safe and even feature some anti-social activities. For example, there is an image of insecurity connected to the Daneshjoo Park which is a deprived area with a low population density, evidence of high anti-social activity and in a poor condition—and with noticeably fewer women visiting than in many other parks (Figure 4). As Aminzadeh [43] notes, while urban parks are valuable for promoting healthy lifestyles, some parks in Iran have become bases for drug trafficking and insecure. This leads to them becoming male-dominated and feeling unsafe for women and children who, as a result, do not visit—although women were observed in all parks, though in different proportions as shown in Table 4. Conversely, Abo Atash, Jamshidieh and Mellat are located in areas of higher socio-economic class, with a high level of use, are often crowded but remain in good condition. This is because of good management, effective lighting, leading to more vitality and security. As Wang et al. [1] found, park accessibility affects the degree of use or non-use and this is also the case in Tehran.

Other neighbourhood parks in the sample have a more usual set of facilities such as paths, opens spaces, lots of trees, ponds and lakes and sport fields. The presence of lakes suitable for boating can be found in seven of the 16 parks (Table 1) and these are clearly an attractive feature, especially in a hot climate, and correlated with the main activities—although not water play. They could offer possibilities for improving health and well-being not yet fully recognised in Iran, despite the presence of water in Islamic and Persian gardens.

Daneshpour and Mahmoodpour [13] noted that lower-income groups tend to use local urban parks more than the destination parks, which results in them being worn out through pressure of use. Khosravaninezhad [44], states that the small green spaces within cities and their benefits for people have been paid less attention. We found variations to this picture, with the parks in the middle socio-economic range being less well-used and then the ones in the lowest range much more well used, on a par with those in higher socio-economic districts. Shahed Park is a regional scale example, and although it has various qualities to attract people it also has an anti-social reputation. As Manning, et al. [16] noted, one of the motivations of people visiting parks is to be in a calm and peaceful environment, where there are fewer social conflicts, especially peak hour of usage of parks (holiday and weekends) and this was found to be the case in Tehran's parks.

In the parks on the edge of the city, with less use and poorer quality of environment and less-well managed tend to be perceived as less safe and so fewer women users were observed there (e.g., Esteghlal and Azadegan) except where there are special facilities or at weekends when it they are busier in general. Azadegan park has had a reputation as an unsafe place. This matches the findings of Lotfi and Koohsari [45] who reported that limited accessibility to Tehran's local parks led to the over-use of existing parks, impacting their efficiency so these parks, while apparently have a good size, are little used. Wekerle and Whitzman [20] found that females are more fearful of crime than males, which this influences the liveability of urban spaces, including parks, while, as Cozens et al. note [23], we found that aspects such as supervision, maintenance and access control in urban parks are important for parks to feel (and be) safer.

One of the key things to emerge from the site observations is the differences in use by men and women as well as by children in some parks—especially those in poorer areas such as Shahed, Shahr and Sadarjangan. Men are free to use spaces at all times of day and in whatever configuration—alone, in pairs or in groups. Women, however, must adhere to Iranian dress codes (heads covered) and are less free to be in parks on their own or in pairs. If in groups, especially with children, that is more common as it is more acceptable. Running and cycling are not activities commonly undertaken by women. Younger girls, around 15 years of age and younger, are allowed to play freely and to run and cycle. The prohibition takes effect after this age. Local parks with plenty of adults present to provide informal monitoring are safer and used more freely by children while in other parks the whole family could be seen together and children were not permitted to move freely away from the vicinity of the parents or other family members.

In terms of the time of visiting, there are clear patterns with a domination in the evenings and night with many but not all parks being popular also in the mornings, especially with men. It has been observed in a previous study by Bahrani and Bell [46] that young unmarried couples (students and young adults) tend to visit at night and prefer less-busy, more secluded areas where they can be alone as found in two of the Tehran parks, Mellat and Jamshidiyeh. Mothers with children or families visit mainly in the later afternoon and evening—after school, work and when it is cooler. However, differences could be observed between the parks in lower socio-economic districts which may be more conservative regarding religion and so tend to follow the Islamic codes more strictly than the visitors to parks in better-off parts of the city where the rules are more relaxed—this aspect needs further study.

As the time of day when parks are most used is clearly the evening and into the night for reasons already noted, this means that lighting, presence of plenty of people and lack of anti-social activity are important for ensuring safety and security in all parks. This feature makes urban parks in Iran very different from those in western countries, where parks are often closed at night due to safety concerns and to prevent anti-social activities such as drug use from occurring. In other countries with hot climates evenings and the night are also popular times for walking, socialising and being outdoors, possibly in parks but possibly not. This is also a subject worthy of further investigation in terms of how safety and security are managed and the role of surveillance in an Islamic society

Given the prevalence of evening and night-time use of parks, it seems clear that lighting and a sense of security are two of the most important factors. Those with good lighting, are well-managed and of good quality such as Mellat, Abo Atash or Bagh Honar are also safe and popular while Daneshjoo, Razi and Bahmaninejad have problems of safety and security which render them less safe.

7. Conclusions

The objective of the research was to attain an overview of the use patterns of a sample of parks distributed across the city of Tehran, where some parks apparently well-sited and good size seemed to be less well-used and to observe how well the existing parks provide for the needs of the people in Iran. The specific research questions were:

- (1) Why are some parks less used than others by some social groups? We found that a combination of factors concerning the quality of the parks such as presence of facilities, how well maintained,

well-lit and safe they, are has a lot to do with their level of use, especially by women. In some cases, the park happens to located in lower socio-economic class areas where anti-social activities seem to be prevalent but also religious practices which restrict some use, for example, by women undertaking physical activities such as running or cycling might be factors which we cannot know for certain but which deserve further attention.

- (2) How well do the existing parks provide for the needs of the people of Tehran? There is a wide range of recreational opportunities available across the sampled parks. Some parks with good layout and facilities are less well used because of, evidence of anti-social behaviour, poor maintenance and accessibility and a lower sense of safety and security. However, while men are well-catered for everywhere, women are found to be losing out in opportunities in a number of specific parks.
- (3) What kinds of activities take place in the parks and what gaps in demand might there be? We found that a wide range of activities are undertaken, ranging from informal recreation (walking, sitting, running, picnicking and children's play as well as a lot of sport and some water-based recreation. In addition, amusements and entertainments are also available in many parks. However, because these are commercial, they are not freely available. The sports facilities are also separately managed and require a fee to use them or membership of a club. However, the other factor which affects demand is the gender difference in relation to certain types of activity and in part associated with social class.

7.1. Significance of the Research

While the research may only deal in detail with the specificities of Tehran, in fact this city is in many ways very typical of cities in countries where massive urbanisation is taking place in a sprawling way and with little concern for any planned green infrastructure. Many cities in developing countries, for example Cairo, Dhaka or Lagos, as highlighted in the 2015 World Economic Forum assessment of risks [47] face similar issues and pressures on the urban space as well as on poorly-funded and short-staffed departments trying to make cities liveable and sustainable. We are now very familiar with the concepts of sustainable cities and the role of green infrastructure but the majority of studies have concentrated on cities in developed and wealthy countries. Few cities in countries like Iran have obtained the evidence necessary to demonstrate to what extent public green areas satisfy the needs of the citizens. When there is greater social injustice, poor housing and a lack of places for children to play, then green spaces become vital elements. Research such as we have presented here (subject to the limitations noted below) can provide the kind of evidence of use by city planners. It is relatively straightforward to collect and requires no sophisticated GIS to apply, although, of course, if the kind of information and analysis collected here is geo-referenced it makes its use much easier.

7.2. Limitations of the Research

This research, although aiming to examine the use of parks in some depth, did not allow any detailed analysis of the layout and design aspects of each park in relation to the activities and potential affordances. Nor does this study present any data from park users (although this will be the subject of a separate paper).

Following on from this work and the limitations identified, future research should aim to collect more detailed data on numbers of users and their activities so as to identify at higher resolution the factors affecting use, popularity and design quality etc. Focused behaviour observation which relates users' activities closely to the parts of parks they use, and the affordances provided there, could be applied in order to identify what works and what does not in more detail. It could also be useful to assess the role of parks in contributing to the health and well-being of the urban residents, as this is an emerging area of importance in city planning.

The place of women and their ability to obtain the benefits of parks is also an issue which is especially relevant in this context and which differs from most Western societies.

Author Contributions: Writing—original draft, F.B. and S.B. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

Appendix A

Table A1. Summary table of qualities of sampled parks.

Park.	Area (ha).	Main Features and Facilities.	Summary of Observation and Relationship of Use to Park Facilities.
Laleh.	28.	Street market, swimming pool, football field, green spaces and large open paved areas.	The main entrance features cultural and educational facilities which attract large numbers of people throughout the day. Once here visitors are invited to move into the main heart of the park where informal physical activities dominate. The swimming pool and other water areas also attract many people owing to the cooling effect of the water. Often numerous groups could be found here undertaking different social activities such as picnicking. Swimming in the pool is also very popular at all times in hotter weather. A market where vendors can sell refreshments and craft goods is also popular and helps to ensure that visitors spend a longer time in the park. The football field is managed separately, so is not freely available but the extensive open spaces result in many spontaneous activities taking place by different groups at all times. The flexibility of these spaces was demonstrated by the wide variety of uses during the observation period.
Abo Atash.	6.5.	Water playgrounds, outdoor theatre, grass field, horse riding manage, nature Bridge, restaurants.	The water playgrounds, create a happy and lively atmosphere for children to play, accompanied by their parents. The gatherings and activities in this area are more frequent in the evening and the outdoor theatre is used at festival times, national celebrations a space for gathering. The park has many shady areas and people use the large open spaces for playing group sports and informal games in the mornings and evenings. There is an area with artificial grass specially designed for a zipline, which, although it takes up space, is hardly used. There is a tower at one of the main entrances of the park, allowing views over the whole park. This area can be crowded compared with other sections. The Nature Bridge or Tabi'at Bridge is a three-floor and multi-functional overpass connecting the two park sections and also includes various restaurants. While it is used all day the peak time is in the evening and at night. Some of the restaurants are very busy.

Table A1. Cont.

Park.	Area (ha).	Main Features and Facilities.	Summary of Observation and Relationship of Use to Park Facilities.
Mellat.	34.	Lake, green spaces and large open paved areas; zoo; Island restaurant; Mellat cinematic Campus.	Mellat Park is one of the attractions of the city of Tehran. It contains a space for sculpture, which is popular for games and community sports during the day, but we can see individuals of different ages during evenings and nights. The lake is popular for recreational boating, often at night and in the evenings. The musical fountains play hourly at night, which draws a large crowd. The zoo is also popular. There are several restaurants next to the lake which attract people throughout the day, but more so at night. The large open area is flexible and suitable for sports and collective games in the early morning, evening and night. Mellat Cinematic Campus is an independent but integrated collection of cinemas and art galleries. In this park, green spaces and open spaces are interconnected organically, and are very flexible. People often come to the park in the evening, at night, and generally out of office hours, and all types of people in the community can be seen there. Different forms of activity take place at different times of the day.
Jamshidiyeh.	69.0.	Waterfall and lake; outdoor amphitheatre; Green spaces and winding paths, restaurant.	This park is one of the most popular in the city, of Tehran in an area of higher social class. It is a peaceful place throughout the day and week, and despite its considerable size and difficulty of monitoring of the whole spaces security is good. The lake with its waterfall is one of the main attractions as it is scenically attractive and cool. The park is quiet during the day but very busy in the evenings at night. The park has two outdoor theatres which host some small gatherings and are usually not crowded, but when the park is crowded they are used for sitting by many people. The park is located in the hills to the north of the city and has a lot of steep paths which may deter some users of make some areas difficult to access.
BaghHonar.	5.9.	Playgrounds, table tennis tables; Iranshahr concert hall and artists' house; green spaces; large open paved areas; street market, café and restaurant.	The concert hall, art galleries, cinema and theatre attracts a large audience from around the city every day, especially from afternoon to midnight. This contrasts with the more local character of most of the visitors. The playgrounds and playing fields for team sports such as football and volleyball, ping pong tables function independently of the park. Due to its main theme, the park in its green spaces contains valuable statues and statues of Iranian artists. In fact, the park's green space has become somewhat a beautiful garden of statue.
Shahed.	3.2.	Playgrounds, open spaces.	The park is a very busy large-scale local park, due to its various qualities, including playgrounds, open spaces for the use of families. The high population of the surrounding areas lead to high levels of use. There are no special facilities so it caters for general recreation by people of all ages.

Table A1. Cont.

Park.	Area (ha).	Main Features and Facilities.	Summary of Observation and Relationship of Use to Park Facilities.
Daneshjoo.	3.2.	Wide entrance, city theatre, green open spaces, children's playground,.	Despite being small and local, this is frequently very crowded in places and at certain times. The theatre area is always full but the rest of the park is often empty due to the presence of anti-social people. The wide entrance of the park is the busiest part of the park because of the theatre. Evening performances lead to the peak time for visits being related to these hours. The children's playground, located in the south eastern corner and closer to residential neighbourhoods, is popular with children living in the vicinity of the park and their peak time of visiting is in the evening when their parents are not at work.
Bahman-inejad.	3.2.	Natural environment, children's playgrounds.	The survey of this local park shows that it meets the needs of near neighbourhood residents. While small it is divided into two sections by an arterial road. This splits the main uses: The eastern part or the play and activities of children and parents and the western part is used for quiet and restful activities. It is very green and natural.
Esteghlal.	1.3.	Neighbourhood park near several residential areas on the edge of the city; green areas, children's playgrounds.	The park is a local park located on the edge of the city. Children use it despite a sense of poor security. In the evenings and after office hours it is popular with families and children. During the rest of the day, adults and elderly people use it but a significant number of migrant workers (Afghan) use the park which also affects the sense of safety and security.
Shahr.	25.	Aquarium, library, bird garden, artificial Lake, peace museum alongside green areas, open spaces and children's play areas.	This park can be divided into two sections, the area with special facilities (aquarium, library, museum, bird garden) visited by specific people or groups from all over the city and the part functioning as a neighbourhood park for local low-income inhabitants. It has low numbers of regular users and this contributes to the feeling of insecurity identified here.
Razi.	25.7.	Sports fields, Razi cultural centre, children's play areas, amusement park, sports fields.	This park has three main segments of users: Those visiting the cultural centre, those using the sport facilities (both operated as separate units) and the rest of the park, including the boating lake. The general users come from nearby as the access is not good. The large spaces and sense of emptiness makes it feel unsafe. The boating lake is popular in the evenings and at night. The children's play areas are also used in the evenings.
Eram.	70.0.	Tehran amusement park, lake, zoo, green spaces.	Eram Zoo, the largest zoo in Iran, is popular during the week with student groups with families during the holidays and weekends. The park is always busy, the funfair being open until late and all kinds of activities are undertaken there.
Shabnam.	0.8.	Wide green spaces, children's play areas.	This park acts as a local neighbourhood park as it just features "normal" park facilities such as open green areas, path network, play areas etc. It is popular and well-used through much of the day by local residents, especially in the evenings.

Table A1. Cont.

Park.	Area (ha).	Main Features and Facilities.	Summary of Observation and Relationship of Use to Park Facilities.
Besat.	53.	Amusement park, theatre, recreational lake, football fields, market, green open spaces, children's play area.	This park is on the southern edge of the city and caters to local people but is also used by new immigrants as a temporary place to stay (squatting, informal camping) which affects the image and sense of security for other users. The population is generally of a lower socio-economic class. The amusement park, is open in the evenings and the outdoor theatre is run as a separate enterprise, as is the football field complex. The lake is the most popular area, with boating and fishing, and the market stalls also attract people in the evening, making it the busiest place in the park.
Azadegan.	112.	Children's play area, green open spaces, recreational lake.	This park, being some distance from the city centre is not busy in the week but more so at weekends and holidays. The playgrounds operate separately and the boating lake is also a popular attraction part of the park. The green open spaces are used for informal spontaneous activities.
Sardar Jangal.	1.3.	Green open spaces, sports and football field, amusement park, lake, children's playground.	The green spaces in this park also contain many mature shade-bearing trees which make it useable in the daytime, although the park is most popular in the evenings and at night. The sports equipment attracts sports enthusiasts during all day hours. Children, teenagers and young people also choose this environment for sport, fun, and sometimes friendly chat. The football field operates separately but is popular.

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